

# Set of articles for Advanced Algorithms (MTAT.03.238) course - Essay exercise.

Choose one of the below articles/topics and write a concise, **exactly 2-page essay** on the paper focusing on algorithmic ideas and main contributions presented or used in the papers. The essay has to capture the overall essence of the main contributions of the paper and invite reading the original article (or its background) in more detail. **Why** is more important here than **How**. But some general statements on How are also needed. With a pointer for further details into the paper itself. Not a single line more than 2 pages, and ideally not more than 5-10 lines shorter than 2 pages.

Describe the **problem**, why is it a problem, what do authors propose in the article, main results that you will find in the article, etc - if possible add (and cite) the key figure(s). Make sure to properly cite the original, and 2-3 more most important background references. Make sure to do a nice "camera ready" version with your name, affiliation, abstract, intro, contents, conclusions, references.

Follow traditional article formatting rules of a conference. E.g. use LNCS TeX style. Don't forget to include proper references. I recommend a 2-column layout. Essay – **2 pages long (exactly)**. No direct quotations allowed. Use your own wording. Or cite - but then with quotes, if absolutely necessary. Include 2-3 core other citations that would help open up the article, too.

E.g. Springer/LNCS styles: <http://www.springer.com/computer/lncs?SGWID=0-164-7-72376-0>

AAAI style: <http://www.aaai.org/Publications/Author/author.php>

**Deadline: Dec. 12th** (before 24h midnight). Every delayed date (EET time, even by 1 minute) will reduce points by 25% of maximum. Even if you do not "need" the points you need to submit the essay to get pass the course.

Many databases are accessible via UTLIB - <http://www.utlib.ee/erialaportaal2/index.php?cmd=db&tk=MT>

**Please add your name after the topic you have chosen - in red (same font as this text) .  
Only first max 5 people can choose one topic.**

*Prof. Jaak Vilo, Dmytro Fishman*

1. A simple algorithm for nearest neighbor search in high dimensions ([http://www1.cs.columbia.edu/CAVE/publications/pdfs/Nene\\_TR95.pdf](http://www1.cs.columbia.edu/CAVE/publications/pdfs/Nene_TR95.pdf))
2. Invitation to algorithmic uses of inclusion-exclusion (<http://arxiv.org/pdf/1105.2942.pdf>)
3. Succinct Dynamic Data Structures (Rajeev Raman, Venkatesh Raman, S. Srinivasa Rao) Algorithms and Data Structures Lecture Notes in Computer Science Volume 2125, 2001, pp 426-437
4. Exact exponential algorithms (<http://dl.acm.org/citation.cfm?id=2428575&bnc=1> )

5. Beyond Social Graphs: User Interactions in Online Social Networks and their Implications (<http://dl.acm.org/citation.cfm?id=2382620> - via UTLIB)
6. Shortest Paths in Microseconds (Rachit Agarwal, Matthew Caesar, P. Brighten Godfrey, Ben Y. Zhao) <http://arxiv.org/abs/1309.0874>
7. Similarity Search in high dimensions via hashing (<http://www.cs.princeton.edu/courses/archive/spring13/cos598C/Gionis.pdf>)
8. An artificial bee colony algorithm for the leaf-constrained minimum spanning tree problem (<http://www.sciencedirect.com/science/article/pii/S1568494608001257>)
9. Brodal and Okasaki, about functional implementation of Brodal heaps([https://karczmarczyk.users.greyc.fr/TEACH/Doc/brodal\\_okasaki.pdf](https://karczmarczyk.users.greyc.fr/TEACH/Doc/brodal_okasaki.pdf))
10. Locality-Sensitive Hashing for Finding Nearest Neighbors [Lecture Notes] Slaney, M. ; Casey, M. (via ieeexplore through UTLIB)
11. PDE: a Pareto-frontier differential evolution approach for multi-objective optimization problems Abbass, H.A. Evolutionary Computation, 2001. <http://dx.doi.org/10.1109/CEC.2001.934295>
12. Succinct data structures for assembling large genomes (Thomas C. Conway\* and Andrew J. Bromage) <http://bioinformatics.oxfordjournals.org/content/27/4/479.full.pdf+html>
13. A Comparative Study of Differential Evolution, Particle Swarm Optimization, and Evolutionary Algorithms on Numerical Benchmark Problems [http://www.mathiasravn.dk/referencer/vesterstr%F8m\\_thomsen\\_2004.pdf](http://www.mathiasravn.dk/referencer/vesterstr%F8m_thomsen_2004.pdf)
14. Dual-Pivot Quicksort <http://iaroslavski.narod.ru/quicksort/DualPivotQuicksort.pdf>
15. Fast Rectangular Matrix Multiplication and Applications by Xiaohan Huang, Victor Y. Pan <http://www.sciencedirect.com/science/article/pii/S0885064X98904769#>